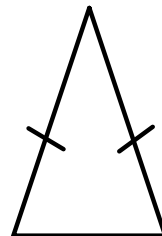
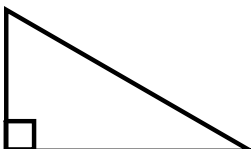
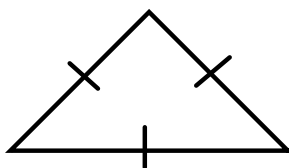


## 2.4 Classifying Geometric Figures:

**Brainstorm your answers to the following.**

1. Given the coordinates of 3 points, how would you determine:
  - a. what type of triangle you have? (equilateral, isosceles, or scalene)
  - b. if it is a right triangle?



**Brainstorm your answers to the following.**

2. Given the coordinates of 4 points, what is sufficient information to determine if the object is a:

- a. parallelogram?

- | opposite sides are parallel and congruent
- | diagonals bisect each other (same midpoint)
- | opposite angles are congruent

} distance  
Slope

- b. rectangle?

all distances  
Slopes

- c. rhombus?

all distance  
Slope

- d. square?

all distances & slopes

### Properties of Quadrilaterals



congruent symbol - same shape and size

Property	Both pair of opp. sides are	Exactly one pair of opp. sides are	Both pair of opp. sides are ≅	Exactly one pair of opp. sides are ≅	All sides are ≅	Four right angles	Diagonals are ≅	Diagonals are ⊥	Diagonals bisect each other	Two pair of adjacent sides are ≅
Parallelogram	X		X						X	
Rhombus	X		X		X			X	X	
Rectangle	X		X			X	X		X	
Square	X		X		X	X	X	X	X	
Kite								X		X
Trapezoid		X								
Isosceles Trapezoid		X		X						

### Classifying Geometric Figures

We are going to analyze some geometric theorems.  
To do this, we will use the following tools:

- slopes of parallel & perpendicular lines
- distance formula
- midpoint formula

### NOTE:

*When solving a problem involving a geometric figure, it is a good idea to start by drawing a diagram on a coordinate grid.*

Ex.1. A triangle has vertices at P(-2, 2), Q(-1, -3), and R(4, 1).

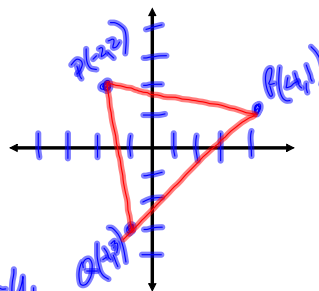
a) Show that this is NOT a right triangle.

$$\begin{aligned} m_{PQ} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{2 - (-3)}{-2 - (-1)} \\ &= \frac{5}{-1} \\ &= -5 \end{aligned}$$

$$\begin{aligned} m_{PR} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{1 - 2}{4 - (-2)} \\ &= -\frac{1}{6} \end{aligned}$$

$$\begin{aligned} m_{QR} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{1 - (-3)}{4 - (-1)} \\ &= \frac{4}{5} \end{aligned}$$

Since no negative reciprocal, it is not a right triangle

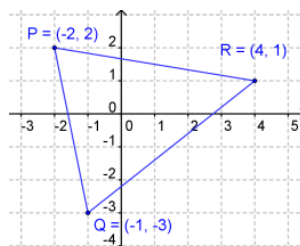


Ex.1. A triangle has vertices at P(-2, 2), Q(-1, -3), and R(4, 1).

b) Show that the triangle is scalene.

$$\begin{aligned} d_{PQ} &= \sqrt{(-1 - (-2))^2 + (-3 - 2)^2} \\ &= \sqrt{(1)^2 + (-5)^2} \\ &= \sqrt{26} \end{aligned}$$

$$\begin{aligned} d_{QR} &= \sqrt{(4 - (-1))^2 + (1 - (-3))^2} \\ &= \sqrt{(5)^2 + (4)^2} \\ &= \sqrt{41} \end{aligned}$$



$$\begin{aligned} d_{PR} &= \sqrt{(4 - (-2))^2 + (1 - 2)^2} \\ &= \sqrt{(6)^2 + (-1)^2} \\ &= \sqrt{37} \end{aligned}$$

$\therefore$  it is a scalene triangle

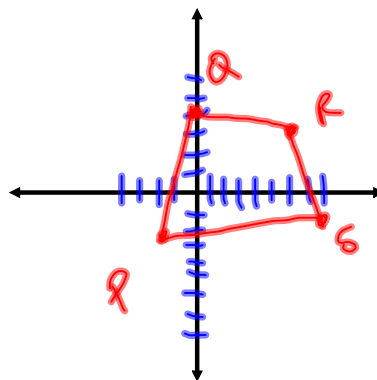
Ex.2. Determine the type of quadrilateral described by the points P(-2, -2), Q(0, 4), R(6, 3), and S(8, -1).

$$m_{QR} = \frac{4 - (-2)}{0 - (6)} \\ = -\frac{1}{6}$$

$$m_{PS} = \frac{-1 - (-2)}{8 - (-2)} \\ = \frac{1}{10}$$

$$m_{PQ} = \frac{4 - (-2)}{0 - (-2)} \\ = \frac{6}{2} \\ = 3$$

$$m_{RS} = \frac{3 - (-1)}{6 - (8)} \\ = \frac{4}{-2} \\ = -2$$



Since all slopes are different it is an Irregular Quadrilateral

Assigned Work: p.101-103 # 2, 5, 6b, 7, 8, 11, 12, 16d